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(54) PRODUCTION OF CALCIUM PHOSPHATE COMPLEX MATERIAL DISPERSED ZIRCONIA

(57)Abstract:

PURPOSE: To improve the strength and toughness of the complex material by hydrothermally treating a slurry of $\text{Ca}_3(\text{PO}_4)_2$ compd. powder contg. dispersed ZrO_2 to obtain the mixed powder in which ZrO_2 is uniformly dispersed in the $\text{Ca}_3(\text{PO}_4)_2$ powder and then sintering the mixed powder.

CONSTITUTION: ZrO_2 having 10-1000nm grain diameter is suspended in an aq. Ca ion soln. such as an aq. soln. of $\text{Ca}(\text{NO}_3)_2$, and an aq. phosphate ion soln. such as an aq. soln. of $(\text{NH}_4)_2\text{HPO}_4$ is added to cause a reaction, and the mixed powder of the $\text{Ca}_3(\text{PO}_4)_2$ compd. and ZrO_2 is precipitated. A slurry of the mixed powder is hydrothermally treated at ordinary pressure and 100-300° C for 0.1-24hr to obtain a mixed powder in which 5-60vol.% of ZrO_2 is uniformly dispersed in the $\text{Ca}_3(\text{PO}_4)_2$ compd. powder. The mixed powder is dried and formed, and then the formed product is sintered at 800-1200° C and 2-100MPa for 0.2-10hr. The sintered body is further post-sintered at 800-1200° C and 50-400MPa in an inert gas such as Ar to obtain the $\text{Ca}_3(\text{PO}_4)_2$ complex material dispersed ZrO_2 having 3.0-3.6g/cm³ density.

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